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**(54) BRISTLE ARRANGEMENT FOR A TOOTHBRUSH**

ANORDNUNG FÜR BÜRSTENBORSTEN FÜR EINE ZAHNBÜRSTE  
DISPOSITION DES SOIES D'UNE BROSSSE A DENTS

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**FR-A- 733 823** **US-A- 3 214 777**

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## Description

This invention relates to a novel device, being a toothbrush.

Toothbrushes are well known articles, and generally comprise a handle, having at one end thereof a bristle-bearing head, all aligned along a longitudinal toothbrush axis. The bristles on such a head are normally arranged in a pattern of discrete tufts mounted in sockets in a bristle face of the head and extending generally perpendicular to the bristle face. In known toothbrushes such tufts are substantially circular in cross section and are mounted in substantially circular section sockets in the head.

Toothbrushes having bristles arranged in a single "mat" covering substantially the entire area of the bristle face are known, e.g. in US 4646381, which also discloses a toothbrush having a combination of circular sectioned tufts, oval sectioned and rectangular sectioned tufts located within a middle area of a larger mat of individual bristles covering a substantial area of the bristle face. US 4268933 discloses a toothbrush having bristles arranged in large tufts of a rectangular shape, having their long dimension aligned substantially across the width of the toothbrush head. US 2209173 discloses a toothbrush having elongated rectangular tufts of bristles with their long dimension aligned substantially parallel to the toothbrush axis, alternating with rectangular tufts which tilt together, the bristles in the tufts being flattened to form a sharp-edged tuft.

Bristle tufts having a substantially circular cross section have substantially the same stiffness to bending perpendicular to the longitudinal axis of the bristles in the tuft ("the tuft axis") whether this direction is parallel to the toothbrush axis or perpendicular to the toothbrush axis, i.e. across the width of the toothbrush. This can have the disadvantage that the tufts have substantially the same stiffness when the head is being moved generally in the direction of the toothbrush axis across the teeth parallel to the gumline, as when the head is being moved in a direction generally perpendicular to the toothbrush axis, up and down the teeth, crossing the gumline. It is desirable that a toothbrush is softer, i.e. has less stiffness to bending when brushing across the gumline, to prevent injury to the gumline.

The inventors have devised a toothbrush having a tuft pattern of elongated mats of bristles, with a rounded tuft of bristles at the end of the head remote from the handle.

The invention therefore provides a toothbrush, having a handle and at one end thereof a bristle bearing head, the bristles on the head all being arranged in a pattern of a plurality of discrete tufts projecting from a face ("bristle face") of the toothbrush head in a direction generally perpendicular to the toothbrush axis, characterised by one or more of the tufts ("first tufts") having a cross section perpendicular to the tuft axis which has a greater dimension in the direction generally parallel to the toothbrush axis than in the direction generally per-

pendicular to the toothbrush axis, in combination with one or more tufts ("second tufts") at the end of the tuft pattern remote from the handle, the second tufts being in the form of either (i) a pattern of discrete tufts arranged in a generally circular or polygonal pattern, or (ii) a single tuft of generally rounded cross section perpendicular to the bristle face, or (iii) a tuft of generally "C" or "U" shaped cross section perpendicular to the bristle face having at least one of the limbs of the "C" or "U" aligned generally parallel to the longitudinal toothbrush axis and with the rounded bend of the "C" or "U" facing the end of the bristle face remote from the handle.

The term "generally parallel to the longitudinal toothbrush axis" includes all directions between absolutely parallel to the longitudinal axis and parallel to the longitudinal sides of the head of the toothbrush. The term "generally circular" includes semicircular.

Typically each of such first tufts covers no more than 25% of the area of the bristle face of the head, for example no more than 20%, suitably less than 10%, preferably less than 5%, for example 1 - 2 % of the area of the bristle face. Typically such tufts may have a ratio of dimension in a direction generally parallel to the toothbrush axis (i.e. "long dimension") : dimension in a direction generally perpendicular to the toothbrush axis (i.e. "width dimension") of 1.5 : 1 or more, suitably 2 : 1 or more, e.g. 2.5 : 1 or more, for example between 2.5 - 3.5 : 1.

The cross section of such first tufts may for example be generally rectangular in shape over a substantial part of their cross-sectional area, having the long dimension of the rectangle aligned generally parallel to the toothbrush axis. The term "generally rectangular" includes *inter-alia* rectangular with rounded corners, lozenge-shaped (i.e. two generally parallel long sides and two rounded ends), parallelogram-shaped and trapezoidal-shaped.

Alternatively the cross section of one or more of the first tufts may have other generally linear polygonal or rounded shapes having a length dimension aligned generally parallel or substantially parallel to the toothbrush axis, for example diamond shaped or rectangular with one or more pointed ends, "L" shaped having a first limb aligned generally parallel to the toothbrush axis and a second limb aligned at an angle to the first limb, e.g. at about 45° to the first limb, or "V" shaped having at least one, preferably both, of the limbs of the "V" aligned at an angle less than about 45° to the toothbrush axis.

The toothbrush may have a single first tuft or a number of first tufts, and the tufts may be of differing cross-sectional shapes combined, for example rectangular or lozenge shaped combined with "L" shaped. Typically the toothbrush of the invention may have between 2 to 25 first tufts, which may all be generally rectangular or lozenge shaped.

For example a first embodiment of the toothbrush of the invention may have a pattern of first tufts which have a generally rectangular cross section perpendicular to

the tuft axis, arranged on its bristle face, the first tufts each having a long dimension between about 0.1 and 0.9, for example between 0.25 - 0.75 of the overall length of the bristle face, with a width dimension between about 0.05 and 0.5, suitably between about 0.1 and 0.5 of the width of the bristle face. Typically the pattern of first tufts may comprise between 5 and 20 of such tufts, for example between 5 and 12. Such first tufts thereby comprise a pattern of long rectangular or lozenge shaped tufts, with their long axes aligned generally parallel to the bristle face. Such first tufts may for example each have such a long dimension, e.g about 0.75 of the length of the bristle face, that each tuft extends substantially along the entire length of the bristle face occupied by the first tufts. Alternatively the long dimension of individual such first tufts may for example be such, e.g about 0.1 - 0.5 of the length of the bristle face, that such first tufts are arranged in two or more, e.g 2 - 6, lateral rows across the width of the bristle face. The first tufts in this first embodiment may be symmetrically disposed about the longitudinal axis of the toothbrush.

Alternatively for example a second embodiment of the toothbrush of the invention may have a tuft pattern comprising 2 or more straight or curved lateral rows, aligned generally across the width of the bristle face, of first tufts, combined with, for example alternating with, one or more straight or curved rows aligned generally across the width of the bristle face, of tufts ("third tufts") which are of generally circular section. The first and third tufts of this second embodiment may be symmetrically disposed about the longitudinal axis of the toothbrush.

Again alternatively for example a third embodiment of the toothbrush of the invention may have a pattern comprising 2 or more straight or curved lateral rows, aligned generally across the width of the bristle face, of first tufts, combined with, for example alternating with, one or more straight or curved rows aligned generally across the width of the bristle face, of third tufts which are of generally rectangular (as defined above) section having their longest dimension aligned across the width of the bristle face. The first and third tufts of this third embodiment may be symmetrically disposed about the longitudinal axis of the toothbrush.

Typically in such a toothbrush there may be 2 to 5, for example 4, lateral rows of first tufts, combined with 1 to 4, for example 3, rows of third tufts. In the rows of first tufts there may for example be 2 to 5 e.g 4 tufts abreast across the width of the bristle face, and in the rows of third tufts there may be for example 2 to 5, e.g 4 third tufts of generally circular section, or 1 to 3, e.g. 2 third tufts of generally rectangular section having their longest dimension aligned across the width of the bristle face, abreast across the width of the bristle face.

Alternatively for example a fourth embodiment of the toothbrush of the invention may have a pattern of first tufts which have a generally rectangular cross section perpendicular to the tuft axis, arranged on its bristle

face, the first tufts each having a long dimension between about 0.10 - 0.9, typically between about 0.25 - 0.5, of the overall length of the bristle face, typically the pattern of first tufts may comprise between 2 and 20 of such first tufts, for example between 5 and 12, such first tufts being combined with one or more first tufts which are "L" shaped having a first limb aligned generally parallel to the toothbrush axis and a second limb aligned at an angle to the first limb, e.g at about 45° to the first limb. Such "L" shaped first tufts may be disposed at the end of the bristle face closest to the handle. The first tufts of this second embodiment may be symmetrically disposed about the longitudinal axis of the toothbrush, and preferably the toothbrush of this embodiment has an even number of such "L" shaped first tufts disposed symmetrically on either side of the longitudinal axis of the toothbrush.

When the second tufts comprise a pattern of discrete tufts arranged in a generally circular or polygonal pattern such second tufts may be in a pattern of tufts of generally circular section arranged in generally a circle, semi-circle, or polygon (each corner of which corresponding to a centre of one of its tufts), which may comprise a pattern of individual tufts arranged around a central tuft. Typically a central tuft may be surrounded by a regular, e.g a hexagonal, pattern of such tufts symmetrically arranged, for example such that there are dual numbers of second tufts, e.g 3 of the surrounding tufts, disposed on either side of the longitudinal axis of the toothbrush. The diameter of such a pattern may typically be around 0.5 - 0.95 of the width of the bristle face in the vicinity of the pattern.

When the second tufts comprise a single tuft of generally rounded, e.g circular, oval or semicircular or semioval cross section perpendicular to the bristle face the diameter of such a tuft may typically be around 0.5 - 0.95 of the width of the bristle face in the vicinity of the tuft.

When the second tufts comprise a tuft of generally "C" or "U" shaped cross section perpendicular to the bristle face having at least one of the limbs of the "C" or "U" aligned generally parallel to the longitudinal toothbrush axis and with the rounded bend of the "C" or "U" facing the end of the bristle face remote from the handle the diameter of the rounded part of such a tuft may typically be around 0.6 - 0.9 of the width of the bristle face in the vicinity of the tuft. The longitudinal axis of the toothbrush may symmetrically bisect the "C" or "U".

Tufts of generally circular cross section may additionally or alternatively be combined with the above described first, second and third tufts having a cross section, perpendicular to the tuft axis, which has a greater dimension in the direction generally parallel to the toothbrush axis than in the direction generally perpendicular to the toothbrush axis in other ways.

The bristles within the first, second and third tufts may be of substantially all the same length, so that the face of the tuft is substantially flat, or alternatively the length of the bristles in the tuft axis direction may vary in

length at different points along the direction of the toothbrush axis, or perpendicular to this axis. Such a variation is particularly applicable to toothbrushes of this invention which have alternating rows of tufts of different sections as described above, such as in the second and third embodiments, and where the individual rows may vary in the length of the bristles contained in them. For example relative to the toothbrush axis the tuft may have a "rippled" or "sawtooth" profile of alternating peaks and troughs, for example as described in DE 34 33 763, WO 91/19437, EP 0449653A, US 4672706, US 451911, US 4268933, US 3229318, US 3188673, US 2797429, US 1943225 and US 74,560 etc.

Suitably the first tufts may comprise bristles of shorter length than those in the second and third tufts, and those of the second and third tufts may be of substantially the same length.

The bristles making up the tufts may be made of plastics materials conventional to the art of toothbrush bristles, for example Nylon. The bristles may be of generally conventional construction, e.g linear filaments of the bristle material having rounded polished ends.

The handle and head may be made of plastics materials conventional to the art of toothbrush handles. The head and handle may be of an overall shape conventional to the art of toothbrushes, and the handle may for example include one or more 'V' shaped folds to modify the flexibility characteristics of the handle, for example as described in EP 0336641 A. The handle may also include one or more grip-enhancing portions for example in the form of rubbery grip mats, for example as also described in EP 0336641 A.

The tufts and individual bristles may be mounted in the toothbrush head by essentially conventional techniques. Preferably the bristles are mounted into the toothbrush head by a process in which the ends of the bristles in the tuft to be fastened into the head ("the fastening ends") are fused together into a mass by heating, and this mass is subsequently or simultaneously fused with the toothbrush head material, by heating the bristles or the mass and the head material to the point of softening, bringing them into contact so that they fuse together, and then cooling them to solidification, so that the tuft is in effect welded into the head. Suitably the head may be preformed with one or more sockets corresponding to the position, number and size of the tuft(s), and the tuft(s) may be fused as described above with the head material around the socket(s). For manufacture by such a process the bristles and head must be made of thermoplastic materials, for example known thermoplastic materials such as nylon at present used in toothbrush manufacture. Suitable processes for making a toothbrush in this way are for example described in US 2664316 and WO 93/12690, the contents of which are included herein by reference.

In an alternative method of making the toothbrush of the invention the bristles of the tufts may be first fused into a thermoplastic block in the above-described tuft pattern, for example using the above-described fusion

process, and this block may then be inserted and fixed, e.g by heat welding, into a cavity in the head of the toothbrush, or alternatively the head of the toothbrush may be moulded around the block.

Alternative methods of making a toothbrush of the invention will be apparent to those skilled in the art.

The toothbrush of this invention may be used in an essentially conventional manner by the user, and the tuft patterns of the toothbrushes of this invention are believed to improve the cleaning efficiency of the toothbrush and is also believed to help to reduce gum injury.

The invention will now be described by way of example only with reference to the accompanying drawings, which are intended to be representative only and not limiting the general concept of this invention.

Figs. 1, 2, 3, 4 and 5 show perspective views of heads of toothbrushes of this invention.

Figs. 6, 7, 8 and 9 show plan views of tuft patterns of the bristle faces of heads of toothbrushes of this invention.

Fig. 10 shows a longitudinal section through the toothbrush of Fig 9.

Referring to Figs 1 to 5 toothbrush heads (1) are shown. Each head (1) is connected to an integral handle (2). The toothbrush axis is indicated by the line A - A in Fig 1, the tuft axis by the line B - B in Fig 1, and the width direction of the head (1) by the line C - C in Fig 1.

On each of the heads (1) of Figs 1 to 5 are mounted tufts (3, generally) extending generally perpendicularly to the bristle face (1A) of the head (1) generally in the direction of a tuft axis B-B.

In Fig 1 first tufts (31) are rectangular in cross section taken perpendicular to the tuft axis B - B with two rounded ends, ie lozenge shaped. The pattern of tufts comprises a number tufts (31) having a long dimension of 0.5 or more of the length of the bristle face (4), which is substantially greater than their width dimension, the long dimension being aligned substantially parallel to the toothbrush axis and with one large second tuft (32) of circular cross section perpendicular to the tuft axis (B - B), at the end of the bristle face (4) remote from the handle (2).

In Fig 2 the first tufts (31) are lozenge-shaped in cross section taken perpendicular to the tuft axis B - B, first tufts (34) are "L" shaped in cross section taken perpendicular to the tuft axis B - B, with a first limb substantially rectangular in cross section with its long limb aligned generally parallel to the toothbrush axis, and a second limb (34A) at an angle of about 45° to the first limb. A second tuft (32) is in the shape in section taken perpendicular to the tuft axis B - B of a "U" shape having two limbs aligned substantially parallel to the toothbrush axis, and its rounded bottom adjacent to the end of the head (1) remote from the handle (2). The longitudinal axis A-A of the toothbrush bisects the "U" between its two limbs.

In Fig 3 first tufts (31) are generally rectangular, i.e, lozenge-shaped in cross section taken perpendicular to the tuft axis B - B, and are arranged in a series of five

curved lateral rows each of four first tufts (31) abreast aligned generally across the width of the bristle face (4). At the end of the bristle face (4) remote from the handle (2) is a pattern of second tufts (32) of generally circular cross section arranged in a symmetrical hexagonal pattern around a central tuft. The diameter of the pattern of second tufts (32) is about 0.9 of the width of the bristle face (4) taken through the centre of the pattern.

In Fig 4 first tufts (31) are generally rectangular, i.e., lozenge-shaped in cross section taken perpendicular to the tuft axis B - B, and are arranged in a series of four straight lateral rows each of four first tufts (31) abreast, aligned generally across the width of the bristle face (4). Between alternate rows of first tufts (31) are located straight rows of third tufts (33) aligned generally across the width of the bristle face, of tufts (33) which are of generally circular section. At the end of the bristle face (1A) remote from the handle (2) is a pattern of second tufts (32) of generally circular cross section arranged in a symmetrical hexagonal pattern around a central tuft. The second tufts (32) and third tufts (33) are longer in the tuft axis direction B-B than the first tufts (31).

In Fig 5 first tufts (31) are generally rectangular, i.e., lozenge-shaped in cross section taken perpendicular to the tuft axis B - B, and are arranged in a series of four straight rows each of four first tufts (31) abreast, aligned generally across the width of the bristle face (1A). Between alternate rows of first tufts (31) are located straight rows of third tufts (33) which are of generally rectangular section, but having their longest dimension aligned across the width of the bristle face (1A), and which are aligned generally across the width of the bristle face. At the end of the bristle face (1A) remote from the handle (2) is a pattern of second tufts (32) of generally circular cross section arranged in a symmetrical hexagonal pattern around a central tuft. The second tufts (32) and third tufts (33) are longer in the tuft axis direction B-B than the first tufts (31).

In Figs. 6 to 9, plan views of heads of (1) of toothbrushes of the invention are shown, looking down the tuft axis B-B.

In the toothbrushes of Figs. 6 and 7, patterns of tufts (31, 32) similar to those in the toothbrush of Fig. 3 are shown. The pattern comprises first tufts (31) which are lozenge-shaped in cross section taken perpendicular to the tuft axis B - B, and are arranged in a series of lateral rows aligned generally across the width of the bristle face (4), these rows being curved in Fig. 6 (i.e. as shown in Fig. 3) and straight in Fig. 7. The longitudinal dimension of the first tufts (31) is such that five first tufts occupy the length of the bristle face (4) occupied by first tufts (31). At the end of the bristle face (4) remote from the handle (2) is a pattern of second tufts (32) of generally circular cross section arranged in a symmetrical hexagonal pattern around a central tuft (32).

In the toothbrushes of Figs. 8 and 9, patterns of tufts (31, 32, 33) similar to those in the toothbrush of Figs. 4 and 5 are respectively shown. The patterns comprise first tufts (31) which are lozenge-shaped in cross

section taken perpendicular to the tuft axis B - B, and arranged in a series of straight lateral rows, aligned generally across the width of the bristle face (1A). Between alternate rows of first tufts (31) are respectively located straight rows of third tufts (33) aligned generally across the width of the bristle face. In Fig. 8 the third tufts (33) are of generally circular section. In Fig 9 the third tufts (33) are of generally rectangular section, ie lozenge shaped, having their longest dimension aligned across the width of the bristle face (4). At the end of the bristle face (4) remote from the handle (2) is a pattern of second tufts (32) of generally circular cross section arranged in a symmetrical hexagonal pattern around a central tuft.

Referring to Fig 10, the head of the toothbrush shown in Fig. 9 is shown in a longitudinal section about the staggered axis (D-D) shown in Fig 9. The toothbrush comprises a head (1), a handle (2), and first (31), second (32), and third (33) tufts. The tufts (31, 32, 33) comprise individual bristles all generally aligned in the direction of the tuft axis (B - B) perpendicular to the bristle face (4). The ends of the bristles in the tufts (31, 32, 33) have been fastened into the head (1) by fusing them by heat into a mass (5) then cooling. In the bristle face (1A) head are located sockets (6), and each mass (5) is located in a socket (6) and fused in place therein with the material of the toothbrush head (1), both the head material and bristle material being thermoplastic. The tufts (31, 32, 33) of the toothbrushes of Figs. 1 to 8 are fastened into the heads (1) of their respective toothbrushes in a similar way to that shown in Fig. 10. The technique used to fuse the mass (5) into the socket (6) may be that of US 2664316 or WO 93/10639, or other known methods, and the fixing of the tufts (31, 32, 33) into the head (1) is shown only representatively.

## Claims

1. A toothbrush, having a handle (2) and at one end thereof a bristle bearing head (1), the bristles (3) on the head (1) all being arranged in a pattern of a plurality of discrete tufts projecting from a face (4) ("bristle face") of the toothbrush head (1) in a direction generally perpendicular to the toothbrush axis, characterised by one or more of the tufts (31) ("first tufts") having a cross section perpendicular to the tuft axis which has a greater dimension in the direction generally parallel to the toothbrush axis than in the direction generally perpendicular to the toothbrush axis, in combination with one or more tufts (32) ("second tufts") at the end of the tuft pattern remote from the handle (2), the second tufts (32) being in the form of either (i) a pattern of discrete tufts arranged in a generally circular or polygonal pattern, or (ii) a single tuft of generally rounded cross section perpendicular to the bristle face, or (iii) a tuft of generally "C" or "U" shaped cross section perpendicular to the bristle face having at least one of the limbs of the "C" or "U" aligned generally

parallel to the longitudinal toothbrush axis and with the rounded bend of the "C" or "U" facing the end of the bristle face (4) remote from the handle (2).

2. A toothbrush according to claim 1 *characterised* in that the cross section of the first tufts (31) is generally rectangular in shape over a substantial part of their cross-sectional area, having the long dimension of the rectangle aligned generally parallel to the toothbrush axis. 5
3. A toothbrush according to claim 1 or 2 *characterised* in that the cross section of one or more of the first tufts (31) have other generally linear polygonal or rounded shapes having a length dimension aligned generally parallel or substantially parallel to the toothbrush axis. 10
4. A toothbrush according to claim 1 *characterised* in that the cross section of one or more of the first tufts (31) is "L" shaped having a first limb (34) aligned generally parallel to the toothbrush axis and a second limb (34A) aligned at an angle to the first limb (34). 15
5. A toothbrush according to claim 1 *characterised* in that the width dimension of individual first tufts (31) is such that the first tufts are arranged in two or more lateral rows across the width of the bristle face (4). 20
6. A toothbrush according to claim 1 *characterised* by having a tuft pattern comprising two or more straight or curved lateral rows, aligned generally across the width of the bristle face, of first tufts (31), combined with, one or more straight or curved rows aligned generally across the width of the bristle face (4), of third tufts (33) which are of generally circular section. 25
7. A toothbrush according to claim 1 *characterised* by having a tuft pattern comprising two or more straight or curved lateral rows, aligned generally across the width of the bristle face, of first tufts (31) combined with one or more straight or curved rows aligned generally across the width of the bristle face, of third tufts (33) which are of generally rectangular section having their longest dimension aligned across the width of the bristle face (4). 30
8. A toothbrush according to claim 6 or 7 *characterised* by two to five third tufts (33) of generally circular section, or one to three third tufts (33) of generally rectangular section having their longest dimension aligned across the width of the bristle face (4), abreast across the width of the bristle face (4). 35
9. A toothbrush according to any one of the preceding 40

claims *characterised* in that when the second tufts (32) comprise a pattern of discrete tufts arranged in a generally circular or polygonal pattern such second tufts are in a pattern of tufts of generally circular section arranged in generally a circle or polygon, each corner of which corresponding to a centre of one of its tufts, which is arranged around a central tuft.

10. A toothbrush according to any one of the preceding claims *characterised* in that the first tufts (31) comprise bristles of shorter length than those in the second (32) and third (33) tufts, and those of the second (32) and third (33) tufts are of substantially the same length. 15

#### Patentansprüche

1. Zahnbürste mit einem Handgriff (2) und an einem Ende davon mit einem Borsten tragenden Kopf (1), wobei die Borsten (3) auf dem Kopf (1) alle in einem Muster mehrerer diskreter Bündel angeordnet sind, die aus einer Fläche (4) ("Borstenfläche") des Zahnbürstenkopfes (1) in einer im allgemeinen rechtwinkligen Richtung zu der Zahnbürstenachse herausragen, gekennzeichnet durch ein oder mehrere Bündel (31) ("erste Bündel") mit einem Querschnitt rechtwinklig zu der Bündelachse, welcher eine größere Abmessung in der im allgemeinen parallelen Richtung zu der Zahnbürstenachse als in der im allgemeinen rechtwinkligen Richtung zu der Zahnbürstenachse aufweist, in Kombination mit einem oder mehreren Bündeln (32) ("zweiten Bündeln") an dem von dem Handgriff (2) entfernt liegenden Ende des Bündelmusters, wobei die zweiten Bündel (32) in der Form entweder (i) eines Musters diskreter Bündel vorliegen, die in einem im allgemeinen kreisförmigen oder vieleckigen Muster angeordnet sind, oder (ii) eines einzelnen Bündels mit im allgemeinen gerundetem Querschnitt rechtwinklig zu der Bürstenfläche, oder (iii) eines Bündels mit im allgemeinen "C"- oder "U"-förmigem Querschnitt rechtwinklig zu der Bürstenachse, wobei zumindest ein Schenkel des "C" oder "U" im allgemeinen parallel zu der Zahnbürstenlängsachse ausgerichtet ist und wobei der gerundete Bogen des "C" oder "U" dem von dem Handgriff (2) entfernt liegenden Ende der Borstenfläche (4) gegenüberliegt. 20
2. Zahnbürste nach Anspruch 1, dadurch gekennzeichnet, daß der Querschnitt der ersten Bündel (31) eine im allgemeinen rechteckige Form über einen wesentlichen Bereich von deren Querschnittsfläche aufweist, wobei die Längsdimension des Rechteckes im allgemeinen parallel zu der Zahnbürstenachse ausgerichtet ist. 25
3. Zahnbürste nach Anspruch 1 oder 2, dadurch 30

gekennzeichnet, daß der Querschnitt von einem oder mehreren ersten Bündeln (31) andere im allgemeinen lineare vieleckige oder gerundete Formen mit einer Längsdimension aufweisen, die im allgemeinen parallel oder im wesentlichen parallel zu der Zahnbürstenachse ausgerichtet ist

4. Zahnbürste nach Anspruch 1, dadurch gekennzeichnet, daß der Querschnitt von einem oder mehreren ersten Bündeln (31) "L"-förmig ist, wobei ein erster Schenkel (34) im allgemeinen parallel zu der Zahnbürstenachse ausgerichtet ist und ein zweiter Schenkel (34A) in einem Winkel zu dem ersten Schenkel (34) ausgerichtet ist.

5. Zahnbürste nach Anspruch 1, dadurch gekennzeichnet, daß die Breitendimension einzelner erster Bündel (31) derart ist, daß die ersten Bündel in zwei oder mehr seitlichen Reihen über die Breite der Borstenfläche (4) angeordnet sind.

6. Zahnbürste nach Anspruch 1, dadurch gekennzeichnet, daß sie ein Bündelmuster aufweist, das zwei oder mehr gerade oder gekrümmte seitliche Reihen, die im allgemeinen über die Breite der Borstenfläche ausgerichtet sind, erster Bündel (31) hat, kombiniert mit einer oder mehr geraden oder gekrümmten, sich im wesentlichen über die Breite der Borstenfläche (4) erstreckenden Reihen dritter Bündel (33), welche im allgemeinen einen kreisförmigen Querschnitt aufweisen.

7. Zahnbürste nach Anspruch 1, dadurch gekennzeichnet, daß sie ein Bündelmuster besitzt, das zwei oder mehr gerade oder gekrümmte seitliche, im wesentlichen über die Breite der Borstenfläche ausgerichtete Reihen erster Bündel (31), kombiniert mit einer oder mehr geraden oder gekrümmten, im wesentlichen über die Breite der Borstenfläche (4) ausgerichteten Reihen dritter Bündel (33), welche im wesentlichen einen rechteckigen Querschnitt aufweisen und mit ihrer längsten Dimension über die Breite der Borstenfläche (4) ausgerichtet sind, aufweist.

8. Zahnbürste nach Anspruch 6 oder 7, gekennzeichnet durch zwei bis fünf dritte Bündel (33) mit im allgemeinen kreisförmigen Querschnitt, oder durch ein bis drei dritte Bündel (33) mit im allgemeinen rechteckigen Querschnitt, die ihre längste Dimension über die Breite der Borstenfläche (4) ausgerichtet haben, nebeneinander über die Breite der Borstenfläche (4).

9. Zahnbürste nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß, wenn die zweiten Bündel (32) ein Muster von im wesentlichen in einem kreisförmigen oder vieleckigen Muster angeordneten diskreten Bündeln aufweisen, derartige

zweite Bündel in einem Muster von Bündeln mit im allgemeinen kreisförmigen Querschnitt vorliegen, das im allgemeinen als ein Kreis oder Vieleck angeordnet ist, wobei jede Ecke davon einem Mittelpunkt eines seiner Bündel entspricht, welche um ein zentrales Bündel herum angeordnet ist.

10. Zahnbürste nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß die ersten Bündel (31) Borsten kürzerer Länge als die der zweiten (32) und dritten (33) Bündel aufweisen, und daß die von den zweiten (32) und dritten (33) Bündeln, im wesentlichen dieselbe Länge aufweisen.

#### 15 Revendications

1. Brosse à dents comprenant un manche (2) et, à une extrémité de celui-ci, une tête (1) portant des poils, les poils (3) de la tête (1) étant tous agencés en une configuration d'une pluralité de touffes distinctes s'étendant à partir d'une face (4) ("face côté poils") de la tête (1) de la brosse à dents dans une direction sensiblement perpendiculaire à l'axe de la brosse à dents, caractérisée par une ou plusieurs des touffes (31) ("premières touffes") ayant une section transversale, perpendiculaire à l'axe de touffe, qui a une plus grande dimension dans la direction sensiblement parallèle à l'axe de la brosse à dents que dans la direction sensiblement perpendiculaire à l'axe de la brosse à dents, en combinaison avec une ou plusieurs touffes (32) ("deuxièmes touffes") à l'extrémité de la configuration de touffes à l'opposé du manche (2), les deuxièmes touffes (32) étant sous la forme de (i) une configuration de touffes distinctes agencées en une configuration sensiblement circulaire ou polygonale, ou (ii) une touffe unique de section transversale sensiblement circulaire perpendiculaire à la face côté poils, ou (iii) une touffe de section transversale sensiblement en forme de "C" ou "U" perpendiculaire à la face côté poils, au moins une des branches du "C" ou "U" étant sensiblement parallèle à l'axe longitudinal de la brosse à dents et la courbure du "C" ou "U" étant tournée vers l'extrémité de la face (4) à l'opposé du manche (2).

2. Brosse à dents suivant la revendication 1, caractérisée en ce que la section transversale des premières touffes (31) est de forme sensiblement rectangulaire sur une partie importante de leur section transversale, la longueur du rectangle étant sensiblement parallèle à l'axe de la brosse à dents.

3. Brosse à dents suivant la revendication 1 ou 2, caractérisée en ce que la section transversale d'une ou plusieurs des premières touffes (31) présente d'autres formes sensiblement linéaires, polygonales ou arrondies ayant une dimension de longueur sensiblement parallèle ou substantielle-

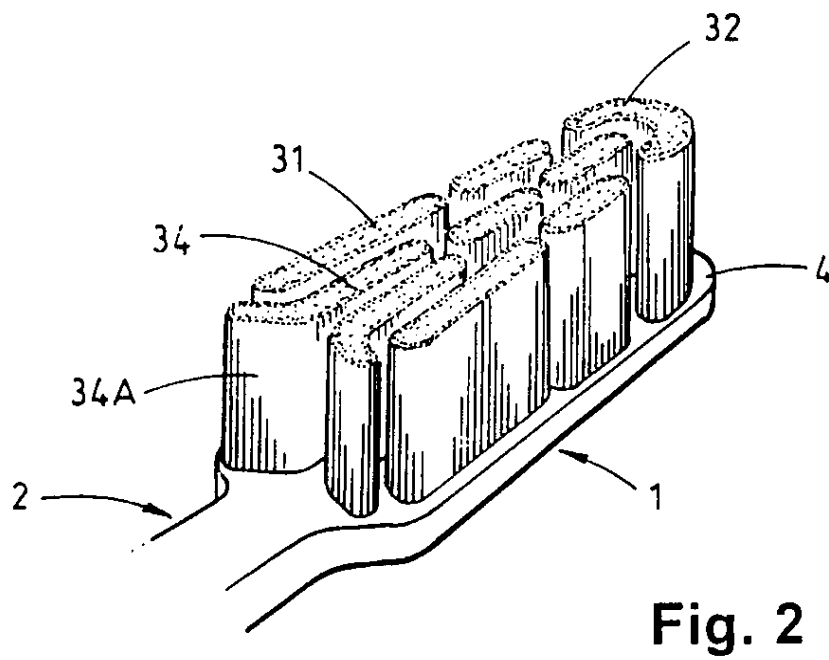
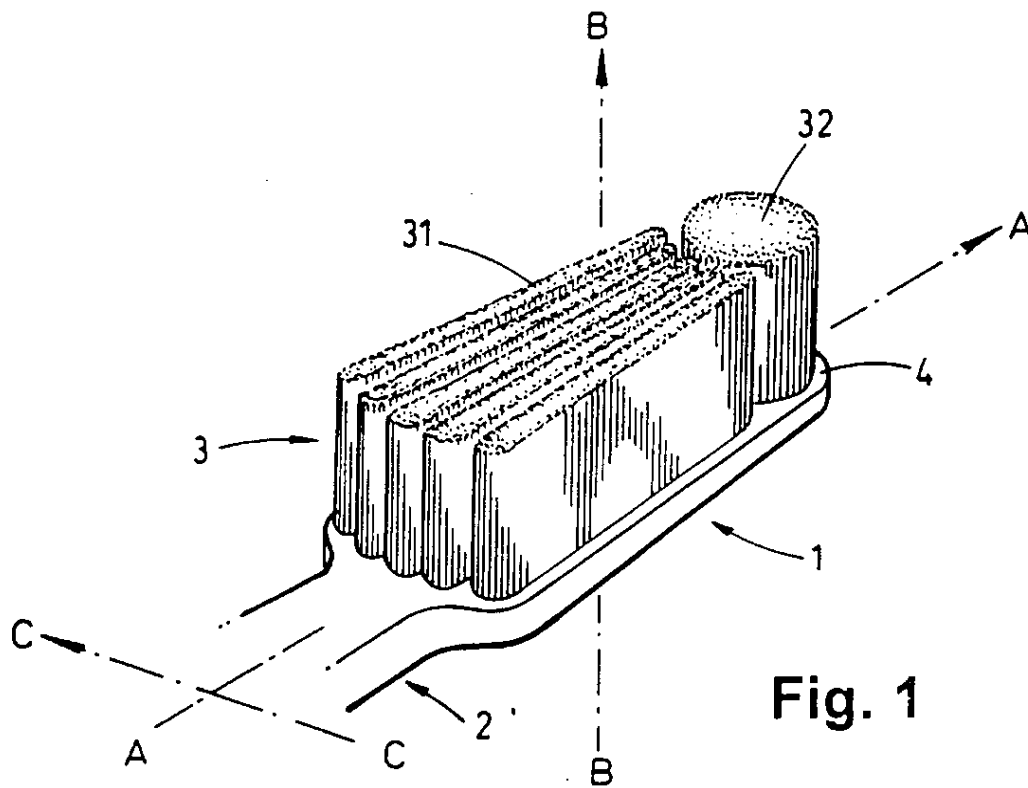
ment parallèle à l'axe de la brosse à dents.

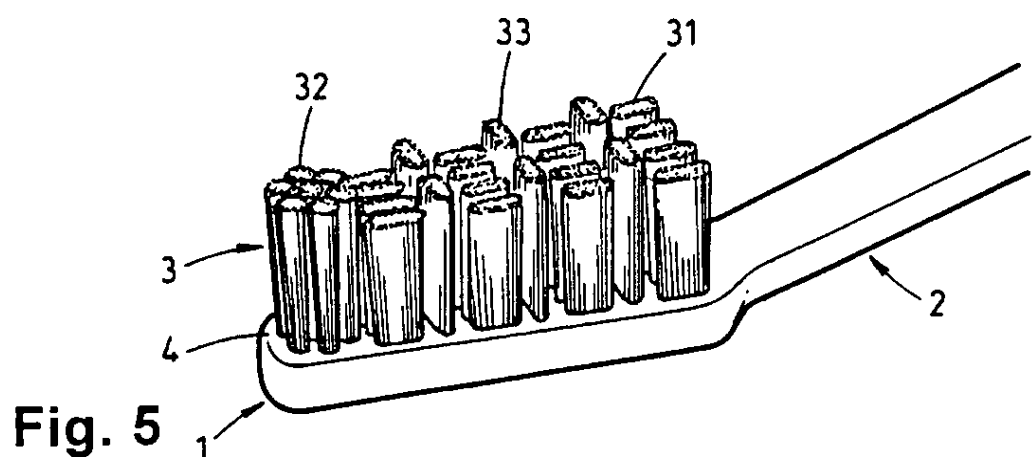
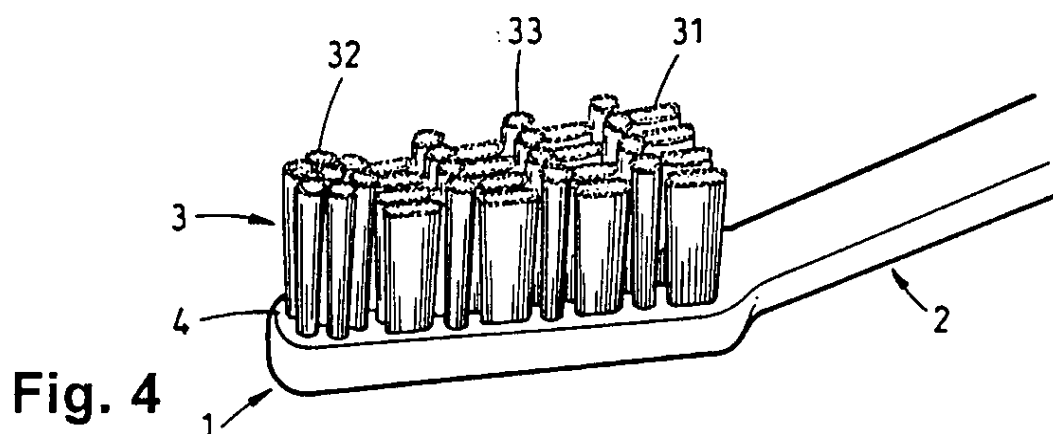
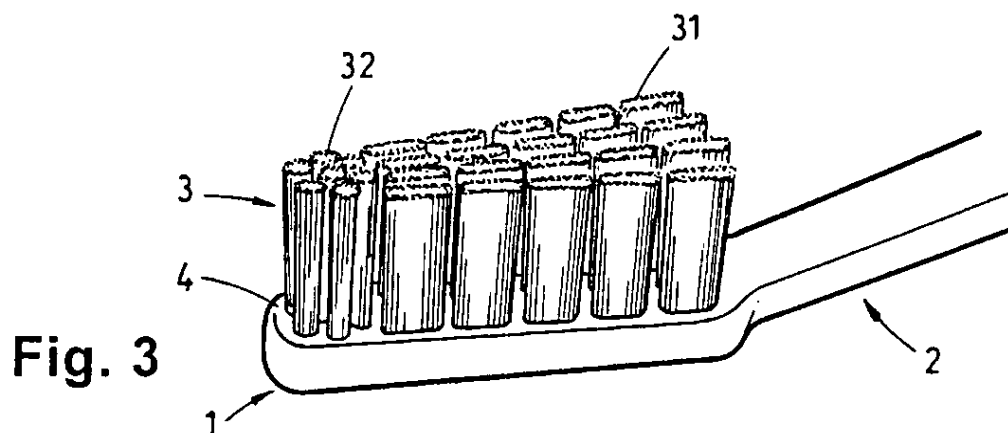
4. Brosse à dents suivant la revendication 1, caracté-  
risée en ce que la section transversale d'une ou  
plusieurs des premières touffes (31) est en forme  
de "L" dont une première branche (34) est sensible-  
ment parallèle à l'axe de la brosse à dents et dont  
une deuxième branche (34A) est inclinée par rap-  
port à la première branche (34). 5
5. Brosse à dents suivant la revendication 1, caracté-  
risée en ce que la dimension de largeur des pre-  
mières touffes individuelles (31) est telle que les  
premières touffes sont disposées en deux rangées  
latérales ou plus, dans le sens de la largeur de la  
face côté poils (4). 10 15
6. Brosse à dents suivant la revendication 1, caracté-  
risée en ce qu'elle a une configuration de touffes  
comprenant deux rangées latérales rectilignes ou  
courbes, ou un plus grand nombre, alignées sensi-  
blement dans le sens de la largeur de la face côté  
poils, de premières touffes (31) combinées avec  
une ou plusieurs rangées rectilignes ou courbes,  
alignées sensiblement dans le sens de la largeur  
de la face côté poils (4), de troisièmes touffes (33)  
qui ont une section sensiblement circulaire. 20 25
7. Brosse à dents suivant la revendication 1, caracté-  
risée en ce qu'elle a une configuration de touffes  
comprenant deux rangées latérales rectilignes ou  
courbes, ou un plus grand nombre, alignées sensi-  
blement dans le sens de la largeur de la face côté  
poils, de premières touffes (31) combinées avec  
une ou plusieurs rangées rectilignes ou courbes,  
alignées sensiblement dans le sens de la largeur  
de la face côté poils, de troisièmes touffes (33) qui  
ont une section sensiblement rectangulaire dont la  
plus grande dimension est alignée dans le sens de  
la largeur de la face côté poils (4). 30 35 40
8. Brosse à dents suivant la revendication 6 ou 7,  
caractérisée par deux à cinq troisièmes touffes (33)  
de section sensiblement circulaire, ou une à trois  
troisièmes touffes (33) de section sensiblement rec-  
tangulaire ayant leur plus longue dimension alignée  
dans le sens de la largeur de la face côté poils (4),  
côte à côte dans le sens de la largeur de la face  
côté poils (4). 45 50
9. Brosse à dents suivant une quelconque des reven-  
dications précédentes, caractérisée en ce que,  
lorsque les deuxièmes touffes (32) constituent une  
configuration de touffes distinctes agencées en une  
configuration sensiblement circulaire ou polygo-  
nale, ces deuxièmes touffes sont dans une configu-  
ration de touffes de section sensiblement circulaire  
agencées sensiblement en un cercle ou un poly-  
gone dont chaque angle correspond à un centre 55

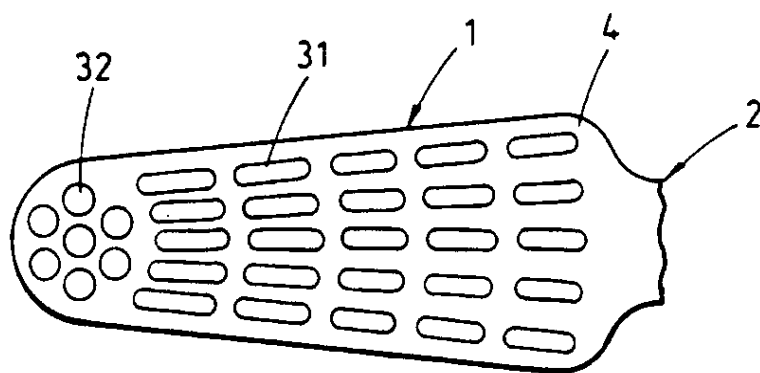
d'une de ses touffes, la dite configuration étant  
agencée autour d'une touffe centrale.

10. Brosse à dents suivant une quelconque des reven-  
dications précédentes, caractérisée en ce que les  
premières touffes (31) comprennent des poils plus  
courts que ceux des deuxièmes (32) et troisièmes  
(33) touffes, et les poils des deuxièmes (32) et troi-  
sièmes (33) touffes ont sensiblement la même lon-  
gueur.

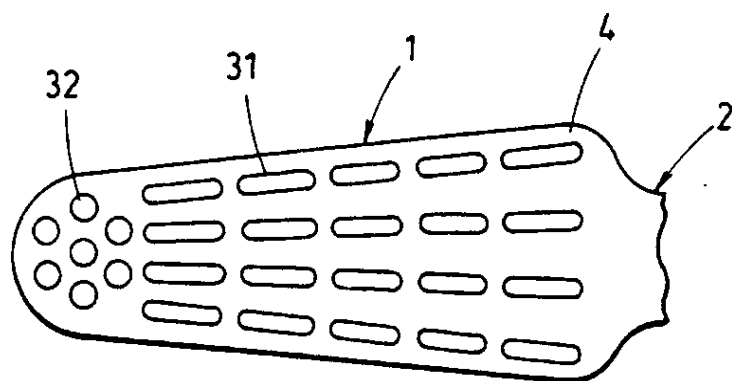




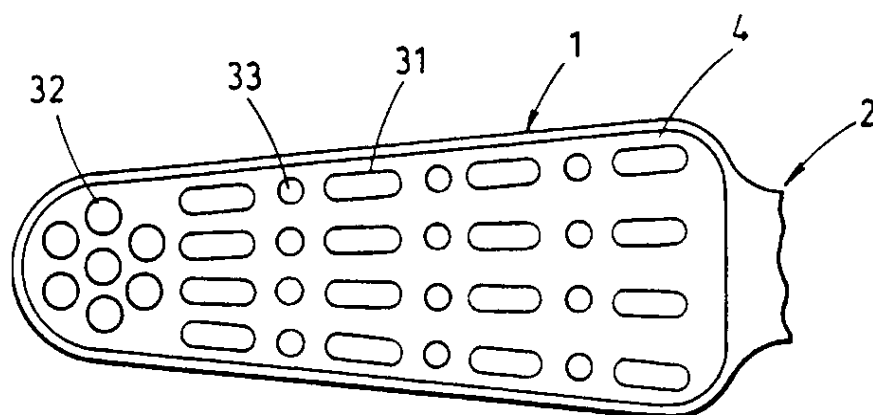




**Fig. 6**



**Fig. 7**



**Fig. 8**

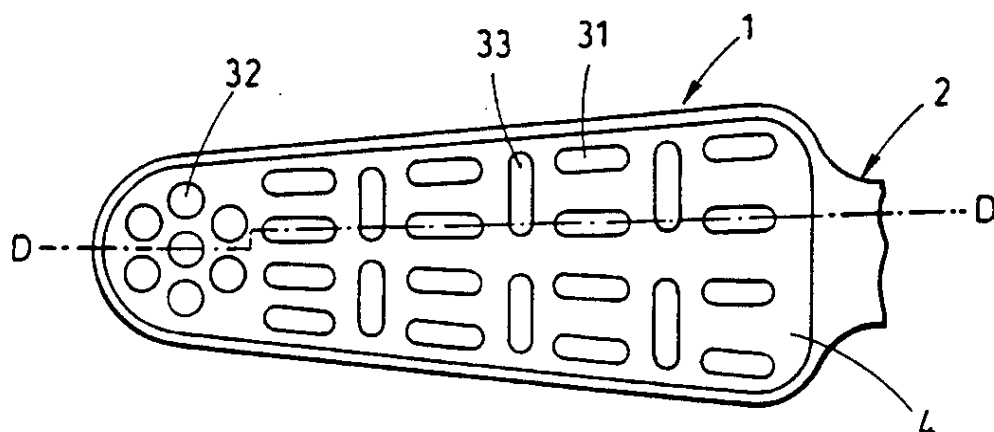


Fig. 9

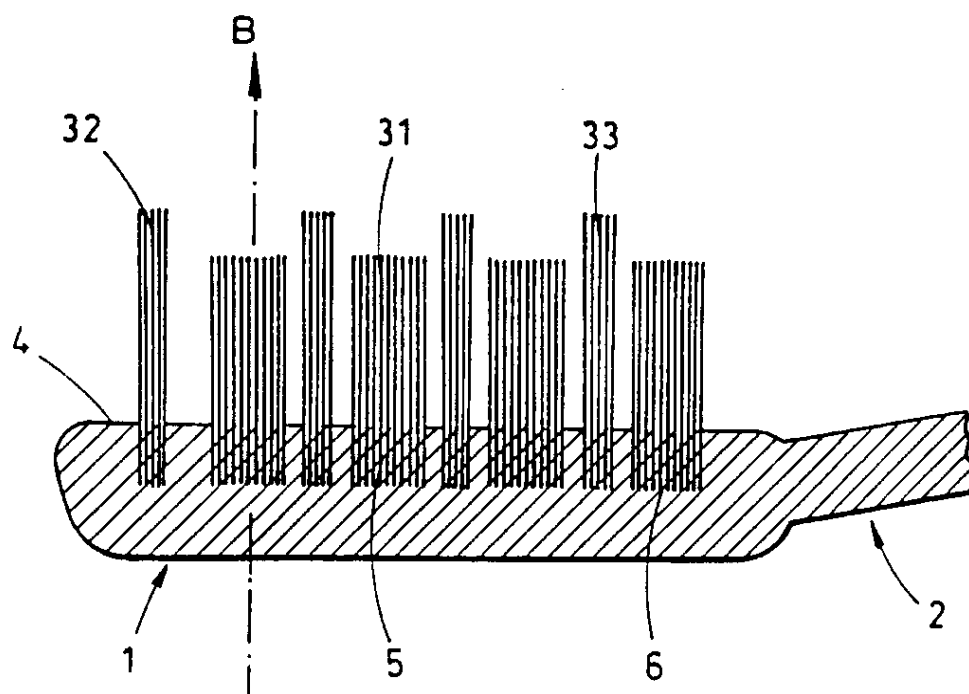


Fig. 10